IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s):	Sarraf et al.
Case:	34-20
Serial No.:	10/636,161
Filing Date:	August 7, 2003
Group:	2616
Examiner:	Phuongchau Nguyen
Title:	Method and Apparatus for Multi-Stream Transmission with Time and Frequency Diversity in an Orthogonal Frequency Division Multiplexing (OFDM) Communication System

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection dated June 14, 2007, of claims 1-5, 7-14, and 16-18 of the above-identified patent application.

REAL PARTY IN INTEREST

The present application is assigned to Lucent Technologies Inc., as evidenced by an assignment recorded on September 15, 1999 in the United States Patent and Trademark Office at Reel 010252, Frame 0922. The assignee, Lucent Technologies Inc., is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

The present application was filed on August 7, 2003 with claims 1 through 18. Claims 1 through 18 are presently pending in the above-identified patent application. Claims 1-5, 7-14, and 16-18 are rejected under 35 U.S.C. §102(e) as being anticipated by Sinha (United States Patent No. 6,292,917). The Examiner indicated that claims 6 and 15 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a method of transmitting a plurality of sub-streams in a multi-stream digital audio broadcasting system (page 4, lines 1-21; FIG. 1: 102, 104; and FIG 2: 202, 204), said method comprising the steps of: allocating a unique frequency partition to each of said sub-streams for a plurality of consecutive time slots (page 2, line 20, to page 3, line 8); allocating a unique time slot to each of said plurality of sub-streams (page 2, line 20, to page 3, line 8); and transmitting said sub-streams to a receiver (page 4, lines 1-21).

Claims 8 and 17 require wherein no two sub-streams associated with the same audio segment are transmitted in the same time slot (page 6, lines 26-27)

Claims 9 and 18 require wherein a unique time slot is allocated to each of said sub-streams by introducing a delay between each of said sub-streams (page 2, line 26, to page 3, line 8, and page 6, lines 12-18).

Independent claim 10 is directed to a transmitter in a multi-stream digital audio broadcasting system (page 4, lines 1-21; FIG. 1: 102, 104; and FIG. 2: 202, 204), comprising: a modulator for allocating a unique frequency partition to each of two or more sub-streams for a plurality of consecutive time slots (page 2, line 20, to page 3, line 8); a delay circuit for allocating a unique time slot to each of said two or more sub-streams (page 2, line 20, to page 3,

line 8); and a transmitter for transmitting said two or more sub-streams to a receiver (page 4, lines 1-21).

STATEMENT OF GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 8-10, 17, and 18 are rejected under 35 U.S.C. §102(e) as being anticipated by Sinha.

ARGUMENT

Independent Claims 1 and 10

Independent claims 1 and 10 are rejected under 35 U.S.C. §102(e) as being anticipated by Sinha. Regarding claim 1, the Examiner asserts that Sinha discloses allocating a unique frequency partition to each of said sub-streams (102 & 104 L, 102 & 104 U - FIG. 2) for a plurality of consecutive time slots (FIGS. 1 and 2; col. 2, line 55; col. 3, line 22; col. 3, line 60, to col. 4, line 7); and allocating a unique time slot to each of said plurality of sub-streams (col. 3, line 22; col. 3, line 60, to col. 4, line 7; col. 5, lines 7-16). In the final Office Action, the Examiner asserts that the channels may correspond to different bands, timeslots (FIGS. 1 and 2; col. 3, lines 5-6, and col. 6, lines 24-26).

In the text cited by the Examiner, Sinha mentions *time slots, code division multiple access (CDMA) slots, and virtual connections* (col. 3, line 60, to col. 4, line 13) and briefly mentions *channels* (col. 5, lines 7-23). Appellants, however, could find no disclosure or suggestion by Sinha of allocating ***unique*** *frequency partitions and* ***unique*** *timeslots*. In particular, Sinha does *not* disclose or suggest allocating a ***unique*** *frequency partition* to each of the sub-streams for a plurality of consecutive time slots; ***and*** allocating a ***unique*** *time slot* to each of the plurality of sub-streams. Independent claims 1 and 10 require allocating a ***unique*** *frequency partition* to each of said sub-streams for a plurality of consecutive time slots; and allocating a ***unique*** *time slot* to each of said plurality of sub-streams.

Thus, Sinha does not disclose or suggest allocating a unique frequency partition to each of said sub-streams for a plurality of consecutive time slots; and allocating a unique time

slot to each of said plurality of sub-streams, as required by independent claims 1 and 10

Claims 8 and 17

Claims 8 and 17 are rejected under 35 U.S.C. §102(e) as being anticipated by Sinha. Regarding claim 8, the Examiner asserts that Sinha discloses wherein no two sub-streams associated with the same audio segment are transmitted in the same time slot (col. 2, line 64, to col. 3, line 22; and FIGS. 1 and 2).

Appellants note that, in the text cited by the Examiner, Sinha teaches that "*the channels may correspond to different frequency bands, time slots, code division slots or any other type of channels*" (Col. 3, lines 5-7; emphasis added.) Appellants, however, could find *no* disclosure or suggestion in Sinha that *no two sub-streams associated with the same audio segment are transmitted in the same time slot.*

Thus, Sinha does not disclose or suggest wherein no two sub-streams associated with the same audio segment are transmitted in the same time slot, as required by claims 8 and 17.

Claims 9 and 18

Claims 9 and 18 are rejected under 35 U.S.C. §102(e) as being anticipated by Sinha. In particular, the Examiner asserts that Sinha discloses wherein a unique time slot is allocated to each of said sub-streams by introducing a delay between each of said sub-streams (col. 2, line 58, to col. 3, line 20; col. 9, lines 48-60)

In the text cited by the Examiner, Sinha teaches, for example, that

> in an illustrative embodiment, interference characteristics are determined for a set of n channels to be used to transmit audio information bits, where n is greater than or equal to two. The audio information bits are separated into n classes based on error sensitivity, for example, the impact of errors in particular audio data bits on perceived quality of an audio signal reconstructed from the transmission. The classes of bits are then assigned to the n channels such that the classes of bits having the greatest error sensitivity are transmitted over the channels which are the least susceptible to interference. The interference characteristics associated with the n channels can be determined by, for example, measuring interference levels at different times and locations for one or more of the channels, or obtaining information regarding known interference levels for one or more of the channels. *The channels may correspond to different frequency*

> *bands, time slots, code division slots or any other type of channels. The channel properties may also change with factors such as time and location within a coverage area.*
>
> In accordance with another aspect of the invention, the assignment of the classes of bits to the channels, as well as the characteristics of the classes and the channels, may be fixed or dynamic. For example, in applications in which the interference characteristics associated with one or more of the channels vary as a function of time, position within a coverage area, or other factors, the assignment of the classes of bits to the channels can be varied so as to ensure that the classes of bits having the greatest error sensitivity continue to be transmitted over the channels which are least susceptible to interference. As another example, amounts of channel resources used for particular classes of audio information bits can vary as a function of time.
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> (Col. 2, line 57, to col. 3, line 22; emphasis added.)

Appellants, however, could find *no* disclosure or suggestion in Sinha of a ***unique*** *time slot that is allocated to each of the sub-streams* ***by introducing a delay*** *between each of the sub-streams*

Thus, Sinha does not disclose or suggest wherein a unique time slot is allocated to each of said sub-streams by introducing a delay between each of said sub-streams, as required by claims 9 and 18

Conclusion

The rejections of the cited claims under section 102 in view of Sinha are therefore believed to be improper and should be withdrawn. The remaining rejected dependent claims are believed allowable for at least the reasons identified above with respect to the independent claims.

The attention of the Examiner and the Appeal Board to this matter is appreciated.

Respectfully,

Date: January 28, 2008

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APPENDIX

1 A method of transmitting a plurality of sub-streams in a multi-stream digital audio broadcasting system, said method comprising the steps of:

allocating a unique frequency partition to each of said sub-streams for a plurality of consecutive time slots;

allocating a unique time slot to each of said plurality of sub-streams; and

transmitting said sub-streams to a receiver

2. The method of claim 1, wherein said sub-streams include at least two core streams and at least two enhancement streams

3. The method of claim 2, wherein said core sub-streams have a maximum separation in the time domain.

4. The method of claim 2, wherein said multi-stream digital audio broadcasting system is an all-digital IBOC (In-Band-On-Channel) system and said core sub-streams have a maximum separation in the frequency domain.

5. The method of claim 2, wherein said multi-stream digital audio broadcasting system is a hybrid IBOC (In-Band-On-Channel) system and said core sub-streams are transmitted in the frequency domain in the innermost side bands.

6. The method of claim 2, wherein said multi-stream digital audio broadcasting system is an all-digital IBOC (In-Band-On-Channel) system and each of said core sub-streams has a maximum separation from one of said enhancement sub-streams in the frequency domain and a maximum separation from the other enhancement sub-stream in the time domain

7. The method of claim 2, wherein said multi-stream digital audio broadcasting system is an all-digital IBOC (In-Band-On-Channel) system and said core sub-streams are separated by a data stream.

8. The method of claim 1, wherein no two sub-streams associated with the same audio segment are transmitted in the same time slot

9. The method of claim 1, wherein a unique time slot is allocated to each of said sub-streams by introducing a delay between each of said sub-streams.

10. A transmitter in a multi-stream digital audio broadcasting system, comprising:

a modulator for allocating a unique frequency partition to each of two or more sub-streams for a plurality of consecutive time slots;

a delay circuit for allocating a unique time slot to each of said two or more sub-streams; and

a transmitter for transmitting said two or more sub-streams to a receiver.

11. The transmitter of claim 10, wherein said two or more sub-streams include at least two core streams and at least two enhancement streams

12 The transmitter of claim 11, wherein said core sub-streams have a maximum separation in the time domain.

13. The transmitter of claim 11, wherein said multi-stream digital audio broadcasting system is an all-digital IBOC (In-Band-On-Channel) system and said modulator provides a maximum separation of said core sub-streams in the frequency domain

14. The transmitter of claim 11, wherein said multi-stream digital audio broadcasting system is a hybrid IBOC (In-Band-On-Channel) system and said modulator allocates said core sub-streams in the frequency domain to the innermost side bands.

15. The transmitter of claim 11, wherein said multi-stream digital audio broadcasting system is an all-digital IBOC (In-Band-On-Channel) system and each of said core sub-streams has a maximum separation from one of said enhancement sub-streams in the frequency domain and a maximum separation from the other enhancement sub-stream in the time domain.

16. The transmitter of claim 11, wherein said multi-stream digital audio broadcasting system is an all-digital IBOC (In-Band-On-Channel) system and said core sub-streams are separated by a data stream.

17. The transmitter of claim 10, wherein no two sub-streams associated with the same audio segment are transmitted in the same time slot.

18. The transmitter of claim 10, wherein a unique time slot is allocated to each of said two or more sub-streams by introducing a delay between each of said two or more sub-streams.

EVIDENCE APPENDIX

There is no evidence submitted pursuant to § 1.130, 1.131, or 1.132 or entered by the Examiner and relied upon by appellant.

RELATED PROCEEDINGS APPENDIX

There are no known decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 CFR 41.37.